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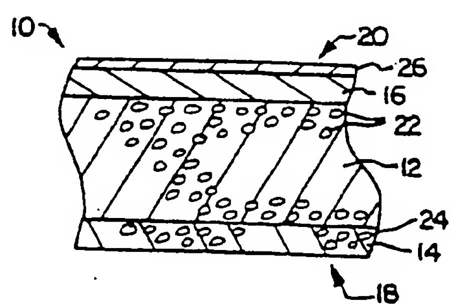

(57) Abstract

Film-forming means (12, 14, 16) are coextruded to form all-plastic multilayer liners and facestocks for pressure-sensitive labels, decals, signs, bumper stickers, and other products formed from sheet and roll stock. A filler (22, 24) differential in the charges for the liner coextrusion differentially affects the roughness of the liner forms. The film materials of the layers of the constructions are selected according to the cost/benefit characteristics of candidate materials considering the functional or operational requirements of the layer in question.

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COMPOSITE FACESTOCKS AND LINERS

The present invention relates to web stock for display products such as labels, signs and the like, and more particularly to constructions and methods of making film facestocks for such display products, liners for such facestocks, and to the combined constructions including the facestocks and liners.

BACKGROUND OF THE INVENTION

It has long been known to manufacture and distribute pressure-sensitive adhesive stock for display products such as labels and signs by providing a layer of face material for the label or sign backed by a layer of pressure-sensitive adhesive which in turn is covered by a release liner. The liner protects the adhesive during shipment and storage. With specific reference to labels, the liner also allows for efficient handling and dispensing of individual labels which have been die-cut from the layer of face material while leaving the liner uncut.

Many label and sign applications require that the face material be a polymeric film material which can provide properties lacking in paper, such as weatherability (for outdoor signs), strength, water resistance, abrasion resistance, gloss and other properties. Because material costs in the manufacture of such film facestocks are relatively high, the desirability of reducing material costs without sacrifice of quality has long been apparent, but little or nothing has been accomplished toward this end.

Because the cost of paper generally compares favorably with the cost of film materials, and because paper liners also have other highly desirable characteristics, the liners used with film facestocks have generally comprised paper web stock coated with a very thin layer of silicone-based release agent. The paper web's outer or "back" face has the roughness required to track well on the smooth steel rolls used in high speed manufacturing. The inner release-coated face of the paper web is uneven enough to slightly roughen the surface of the adhesive protected by the liner, thus preventing subsequent air entrapment and bubble formation between label and container in labeling applications.

However, paper readily absorbs and desorbs moisture, leading to curling and distortion of film facestock with which a paper liner is used. This is particularly a problem with sheet facestock used, say, for signs and decals. Moisture absorption and curling have been reduced to a degree by coating the outside face of the paper liner with a thin moisture barrier layer of film material, but edge absorption or gradual moisture transmission through the moisture barrier itself have largely thwarted efforts to eliminate the problem of curling of the liner and consequent distortion of the film facestock.

Another disadvantage of paper is its relative mechanical weakness. This is particularly a drawback in high speed packaging of high volume consumer products where labeling machinery must dispense rolls of liner-carried labels at high speed. A break in the paper liner forces shutdown of the entire packaging line until the labeling operation is properly reset. As line speeds have continued to increase in recent years, the severity of this problem has led some mass packagers to specify

that labels are to be carried on polyester film liner. The great strength of the polyester film eliminates the liner breakage problem, but at a price which reflects very much higher material costs than those associated with paper.

The present invention

The present invention opens the way to substantial cost savings in the manufacture of film facestocks while at the same time maintaining the desirable characteristics of the film facestocks which have been used prior to this invention. In a word, costs are greatly reduced at little or no sacrifice of quality, and even with a gain in quality in some instances.

In another aspect, the present invention replaces paper liner stock by liner stock of polymeric film material. This is done in such a way as to simulate those characteristics of paper that provide for good web tracking and adequate prevention of the problem of air entrapment and bubbling. At the same time, the problems of curling and paper breaking are eliminated because the film material used according to the invention is inherently moisture-insensitive and is much stronger than paper. All this is accomplished at little or no increase over the cost associated with paper liners. In a word, quality is greatly improved at little or no increase in costs, and even with a reduction in costs in some instances.

Liner stock constructions illustrating the invention will be described first. A prototypical example is illustrated in FIG. 1, which shows a multilayer web

construction generally indicated by the reference numeral 10. The multilayer construction 10 includes a core layer 12, and skin layers 14 and 16. A first face, generally indicated by the reference numeral 18, is the outer or "back" face of the liner stock. This face is identified with the side of the web that will contact and be guided by the smooth steel rolls of the manufacturing line in which the liner stock is to be employed. A second face, generally indicated by the reference numeral 20, is the inner face of the liner. This face is identified with the side of the liner nearest the adhesive to be protected by the liner.

The layers 12, 14, and 16 comprise polymeric film materials and are formed by simultaneous extrusion from any suitable known type of coextrusion dies such as, for example, a Cloeren "vane" die heretofore employed, for example, to form multilayer films used in food packaging applications. The layers 12, 14, and 16 are firmly adhered to each other in a permanently combined state to provide a unitary coextrudate for all three layers, although any one or more polymers or copolymers which will form firmly adherent films when coextruded and which are otherwise suitable, particularly in respect of heat resistance and hardness, may be employed, such as acrylonitrile butadiene styrene, nylon, and polystyrene.

At least one of the layers of the coextrudate is loaded with filler material to provide a continuous phase of the film-forming material itself and a discontinuous phase of the filler material. Thus, in the example of FIG. 1 the core layer 12 is loaded with filler 22. Mica is presently preferred as filler for its heat resistance and for its flatness which contributes to stiffness, but other fillers may be used, such as calcium carbonate,

wollastinite, glass fibers and talc. The filler comprises between about 10% and 40% by weight of the core layer and is mixed into the charge of film-forming resin which is fed to the extrusion orifice associated with formation of the core layer 12.

In the example of FIG. 1, the skin layer 14 on the back side 18 of the liner stock construction also contains filler 24. The proportion of filler in the skin layer 14 is between about 1% and 15% by weight. Again, mica is presently preferred, but other fillers such as those mentioned above may be used. The filler 24 is mixed into the charge of film-forming resin which is fed to the extrusion orifice associated with formation of the skin layer 14.

It will be understood by those in the industry that at least some materials used as fillers may also be used in small amounts as additives, such as a coloring agent, an antistatic, an antioxidant, a whitening or coloring means, or for other similar purposes. However, such other uses do not generally affect the mechanical behavior or nature of the formed film, and do not represent filling of the film as contemplated by the invention.

Release means is provided on the second face or inner side 20 and may comprise a silicone release coating 26 on the skin layer 16. The skin layer 16, being of polypropylene or other material having the good silicone holdout properties of plastics, helps assure good release action and avoidance of blocking by substantially acting as a stop against absorption of the release layer into the core layer and thereby maintaining the uniformity of the release coating 26 after it is applied.

FIG. 2 illustrates a liner stock construction 10a which is similar in many ways to the construction 10 of FIG. 1, and in which similar components are numbered as in FIG. 1 but with the addition of the letter "a". In the construction 10a of FIG. 2, however, there is no separate skin layer on the "back" side or first face 18a. Instead, the first face 18a comprises the outer or exposed side of the core layer 12a.

In the constructions shown in FIGS. 1 and 2, the first and second faces are roughened by the mechanical effect of the filler material, the first face to a greater degree than the second face. The overall range of roughness of the first face is between about 100 and 500 Sheffield units, but the extremes of this range depend somewhat on the form of construction used. Thus, the range of roughness of the first face 18 in the construction of FIG. 1 results from the mechanical effect of the filler 24 contained in skin layer 14 and ranges between about 100 and 350 Sheffield units, and the range of roughness of the first face 18a in the construction of FIG. 2 results from the mechanical effect of the filler 22a in core layer 12a and ranges between about 125 and 500 Sheffield units.

The overall roughness of the second face in each of the constructions shown in FIGS. 1 and 2 is in a range of from about 5 to 150 Sheffield units. In both these illustrated constructions, the roughening of the second face 20 or 20a is by the mechanical effect of the filler 22 or 22a in the core layer 12 or 12a acting through the skin layer 16 or 16a.

Even though the lower end of the roughness range for the first face (about 100 or 125 units) is below the upper end of the roughness range for the second face

(about 150 units), in any particular construction the roughness of the first face will exceed that of the second.

Both the continuous phase of the core layer 12 (or 12a) and the discontinuous phase of filler material 22 (or 22a) are dimensionally stable under conditions of moisture absorption or desorption such as may occur during long periods of warehousing in humid or dry climates. The same is true of the two-phase skin layer 14 of FIG. 1. The skins 16 and 16a are similarly stable. The dimensional stability of each liner construction is therefore independent of humidity conditions and the construction therefore remains flat (not curled or distorted) under different humidity conditions as encountered at different geographic locations or at the same location at different times. The core layers, as well as the skins of the constructions 10 and 10a, are substantially free of voids so that the web also remains flat and undistorted under varying web temperature conditions as encountered in hot air drying of inks or coatings for facestocks with which the liner is used.

One accepted test of flatness uses a test sheet of the stock being tested which is 36 inches long and 24 inches wide. The sheet is considered flat if it exhibits a lift of no more than 1/4 inch at any corner, edge or interior area portion under the humidity condition or conditions encountered. Such a stock may test "flat" at say 50% relative humidity, a humidity level commonly used at present for quality testing at the factory, but may fail the same test under greater or lesser humidities, particularly where an extreme change in humidity is encountered in the field. In contrast, test sheets of the

constructions of the present invention, such as constructions 10 and 10a, exhibit less than 1/8 inch lift, and in fact little or no discernable lift, under any humidity condition that can be expected to be encountered, say from 5% to 100% relative humidity.

It will be seen from the foregoing that an all-plastic liner has been provided, with both faces roughened but to different degrees. From a method standpoint, this difference in degree of roughening is developed by providing a plurality of at least two charges of film-forming resin in which a fill differential is predefined by mixing filler in the charges to preselected differing degrees (one of which may be zero) so that the charges differ in degree of fill. The fill differential may also be predefined, in whole or in part, by using, for different charges, fillers of different particle size and/or of any other differing charge characteristics, such as shape, sufficient to affect the roughness of each face of the resulting coextrudate. The charges are coextruded to thereby both (1) form a multilayer polymeric liner comprising cojoined layers and (2) establish the predefined fill differential between different layers of the formed liner and thereby differentially affect the roughness of the liner faces. The preselected differing degrees and/or characteristics of filler mix are chosen such that the face of the liner which is to contact the adhesive surface of label stock exhibits a degree of roughness suitable for the label adhesive and the face of the liner which is to be the exposed face in use exhibits a higher degree of roughness suitable for high speed web tracking.

Thus, in the manufacture of the liner of FIG. 1, charges A, B, and C, corresponding respectively to layers 16, 12, and 14, may be prepared for coextrusion through a coextrusion die 30, as schematically illustrated in FIG. 3A. By preselection, charge A contains no filler, charge B contains the highest degree of filler within the ranges specified earlier, and charge C contains a lower degree of filler within the ranges specified earlier. Upon coextrusion through the die 30, the charges form a multilayer extrudate to which the silicone release coating 26 (FIG. 1) may be applied at station R to provide the multilayer web construction 10 having the face 18 roughened to a relatively high degree and the face 20 roughened to a lower degree. The release coating is dried or cured following application by any suitable means (not shown). Prior to application of the release coating at station R, the formed films may be hot-stretched in a known manner to provide machine direction orientation of the liner 10. This is generally done for "roll liner," but not "sheet liner," which terms are defined below.

In accordance with well-known practice in the industry, the release face of a release liner may be coated with a layer of pressure-sensitive adhesive for subsequent transfer of the adhesive to the facestock with which the liner is employed. When the facestock is combined with the liner, the adhesive is joined to the facestock. Later, the liner is removed to expose the adhesive, which now remains permanently joined to the facestock.

Thus, as indicated in FIG. 3A, adhesive may be applied at station S following drying or cure of the release coat previously applied at station R. This may

be a tandem coating operation, or the adhesive coating may be on a separate coating line. Or, the adhesive may be applied at some later time prior to the combining of the release liner 10 with facestock. The combining of the liner with a facestock 32 is diagrammatically illustrated in FIG. 3B. FIG. 3C diagrammatically illustrates the die-cutting of the facestock 32, at a station T, into a series of pressure-sensitive labels 34 carried by the release liner 10. As is well known, this step is usually performed by rotary cutting dies and involves the stripping of the matrix (not shown) of waste or trim surrounding the formed labels. FIG. 3D illustrates the application of the labels 34 to passing workpieces 36 by use of a peelback edge 38 to dispense the labels 34 by progressively removing the liner from them in a well-known manner to thereby expose the adhesive side of the labels and project the labels into contact with passing workpieces.

FIG. 4 diagrammatically illustrates a film of conventional or prior art facestock 32 with pressure-sensitive adhesive 40 permanently combined therewith, such facestock being employed in the methods or pressures of the invention at the stage illustrated at the right end of FIG. 3B or the left end of FIG. 3C. At this stage, the adhesive 40 (not shown in FIGS. 3A to 3D) may be releasably carried on the liner 10 of the invention (on or with which it may have been previously coated or combined, as by the previously mentioned coating step at station S). Alternatively, the adhesive 40 may have been directly coated on or combined with the facestock 32 prior to the combining of the facestock with the liner 10. The liner 10 is not shown in FIG. 4; if it were,

this figure would illustrate one aspect of the present invention, namely, the combining of a conventional type of facestock with a coextruded liner of the type taught herein.

Where the adhesive contacts the inner face of the liner 10, either at station S or upon the combining of the facestock with the liner 10 if the adhesive is originally coated on or combined with the facestock, the roughness of face 20 of the liner 10 is imparted to the adhesive. When the adhesive is later exposed, as at face 39 in the step illustrated in FIG. 3D, the exposed adhesive face exhibits the roughness imparted by face 20 of the liner. This roughness performs an important function in eliminating or minimizing air entrapment during label application and the resultant forming of blisters or high spots on the applied label.

Meanwhile, the reverse or back face 18 of the liner 18, with its comparatively higher degree of roughness, tracks smoothly and securely and without slippage on the steel idler rolls and drive rolls (not shown) used to guide or drive the liner 10 in any of the stages of FIGS. 3A to 3D.

It will be understood that the operations shown in FIGS. 3A to 3D will often be done at different locations by different manufacturers, or they may be combined. For example, the steps of FIG. 3A may be performed by a liner and adhesives manufacturer, the steps of FIGS. 3B and 3C may be performed by a label manufacturer on one continuous pass, rather than being interrupted by a wind-unwind sequence as illustrated, and the steps of FIG. 3D may be performed by a packager of manufactured products.

It will be seen from the foregoing that the differential fill of the charges to be extruded can produce a degree of roughness at the inner face 20 of liner 10 that is suitable for roughening the surface of adhesive 40 (FIG. 4) and can also produce a greater degree of roughness, suitable for high speed web tracking, at the back face 18 of liner 10.

Facestock which is formed into labels is usually wound and unwound in roll form and is therefore one form of what is known as "roll stock" or "roll facestock," and the accompanying liner is called "roll liner." The foregoing relates to roll stock and roll liner. In many respects, the invention also applies, however, to "sheet liner" used with "sheet stock" which might be formed as indicated in FIGS. 3A and 3B but would then be cut into sheets and decorated (by screen printing, for example) for use as decals, bumper stickers, thermal die-cut signs, and the like. Materials and procedures used for sheet stock and sheet liner may be the same or may differ to some degree from those used for roll stock and roll liner, but the principles of the construction and manufacture of the liner can be similar whether it be roll liner or sheet liner.

The release liner 10a of FIG. 2 may be roll liner or sheet liner. This liner 10a, with its differential roughening, may be extruded in a manner similar to that indicated in FIG. 3A, but with only two charges corresponding to the layers 16a and 12a. The charge corresponding to layer 16a has no filler and the charge corresponding to layer 12a includes the filler 22a mixed therein. This differential fill as between layers 12a and 16a causes a relatively high degree of roughness at

face 18a by relatively direct action and a lower degree of roughness at face 20a on which the same filler 22a acts more indirectly through the layer 16a.

Turning now to facestock, prototypical examples of film facestocks illustrating the invention are seen in FIGS. 5 and 6. In FIG. 5, a multilayer web construction, generally indicated by the reference numeral 50, comprises a coextrudate including a core layer 52, a skin layer 54 on the face side of the coextrudate, and a skin layer 56 on the inner side of the coextrudate opposite the face side. Combined on the inner side of the coextrudate is a pressure-sensitive adhesive layer 58. In FIG. 6, a multilayer web construction, generally indicated by the numeral 50a, comprises layers 52a, 54a, 56a, and 58a generally corresponding to the layers 52, 54, 56, and 58 in FIG. 5. However, in FIG. 6, tie layers 53 join the core layer 52a to the skin layers 54a and 56a.

The coextrudates of FIGS. 5 and 6 are similar to the previously described liner stock in that they comprise polymeric film materials, are formed by simultaneous extrusion from a suitable known type of coextrusion die, and are adhered to each other in a permanently combined state to provide a unitary coextrudate. The FIG. 5 construction is used when the materials of the core and skins are such that these layers firmly adhere or bond to each other when coextruded as adjacent film layers. The FIG. 6 construction, with the tie layers 53, is used when the core and skin materials do not sufficiently adhere or bond to each other when they are extruded together. Generally, the construction of FIG. 5 is presently used for roll film facestock and that of FIG. 6 for sheet film facestocks because, while polyethylene is presently preferred as the core material for both applications, roll

film facestocks and sheet film facestocks generally use different skin materials, and the presently preferred material for the skin of the roll film facestock (ethylene vinyl acetate) is compatible with polyethylene in respect of inherent adhesion or bonding, while the presently preferred material for the skin of the sheet film facestock (polyvinyl chloride) is not.

The materials of the layers of constructions 50 and 50a are selected according to the cost/benefit characteristics of candidate materials considering the functional or operational requirements of the layer in question. An important concept of the invention is the application of this principle to the manufacture of facestock by forming the facestock as a coextrudate of materials so selected.

Thus, the facestock at its outside surface may require high weatherability and printability and good uniformity and control of surface texture, whether gloss or matte, whereas these qualities either are not necessary or are required in far lesser degree in the core of the facestocks. The latter, however, must be such as to give the facestock opacity and the desired degree of stiffness, as well as sufficient body and strength, and represents generally the great bulk of the total material used in the construction. The stiffness of this core material should be between about 10 and 100 Gurley. The inner surface of the film coextrudate must give good anchorage for the adhesive.

The presently preferred material for the core layers 54 or 54a in many facestock applications is polyethylene of low, medium, or high density of between about .915 and .965 specific gravity. This is a relatively low cost, extrudable film-forming material whose stiffness

(ranging through decreasing degrees of flexibility to semirigid) may be determined by the density selected, and whose body and strength are sufficient for most uses. Polyethylene of lower densities, down to a specific gravity of .890, may be employed for greater flexibility.

Another preferred material for the core layers 54 or 54a is polypropylene (or a propylene copolymer) having a flex modulus range of between about 130,000 and 250,000 psi at 73^{o}F, depending on the stiffness desired.

Ethylene vinyl acetate is generally the presently preferred material for both skin layers 54 and 56 in roll film applications, while polyvinyl chloride is generally the presently preferred material for both skin layers 54a and 56a in sheet film applications. A suitable resin for tie layer 53 in this instance is "CXA", marketed by DuPont. Another material for forming tie layers is "Plexar" marketed by Chemplex Co. Other specific materials are also available for performing the tying function in coextrusion operations. The outer surface of the skin layer 54 or 54a is corona-treated in a known manner to increase printability of the skin.

The preferred identity of the outer and inner skin layer material at present is partly a choice of convenience in reduction to practice, and it is contemplated that these materials often will not be identical in actual manufacture. For example, ethylene vinyl acetate might be the material of choice for the outer skin, but ethylene acrylic acid might be used on the inner skin for better anchorage to, say, an acrylic adhesive of choice.

Other materials for the skin layers include ethylene acrylic acid, ethylene methyl acrylic acid, ethylene ethyl acrylate, ethylene methyl acrylate, acrylonitrile butadiene styrene, nylon, polybutylene,

polystyrene, polyurethane, polysulfone, polyvinylidene chloride, polypropylene, polycarbonate, polymethyl pentene, styrene maleic anhydride, styrene acrylonitrile, ionomers based on sodium or zinc salts of ethylene/-methacrylic acid, acrylics, cellulosics, fluoroplastics, nitriles, and thermoplastic polyesters.

While the foregoing examples of facestocks have employed skin layers on each side of the core, there are instances where a skin layer is employed only on the outer side of the construction, such as the construction 60 shown in FIG. 7, which employs the single skin layer 66 on the outer side of a core layer 62. In this instance, the pressure-sensitive adhesive layer 68 is directly adjacent the core layer. For example, such a construction could be used for the manufacture of high durability labels. Material presently preferred for the core layer in such instance is polyvinyl chloride or acrylonitrile butadiene styrene, and for the skin layer, polyvinylidene fluoride.

It will be understood from the foregoing that multilayer film facestocks have been provided having a relatively thick core layer of polymeric film material which contributes the majority of the stock's dimensional stability and stiffness, having a cojoined, relatively thin, ink-printable skin layer at least at the face side of the construction, and having a pressure-sensitive adhesive layer combined at the sides of the construction opposite the face side. From a method standpoint, this is accomplished by coextruding a plurality of at least two charges of film-forming resin to form a coextrudate having a relatively thick core layer and at least one relatively thin skin layer after preselecting the charge for the core layer, as by selection of density or flex

modulus, to provide the degree of stiffness suitable for the label or sign application, and after preselecting the charge for the skin layer to provide a skin adapted to the intended decorating process, and combining the coextrudate with a pressure-sensitive adhesive layer.

Thus, in the manufacture of the facestock 50 seen in FIG. 5, charges D, E, and F, corresponding respectively to layers 52, 54, and 56, may be prepared for coextrusion through a coextrusion die 70, as schematically illustrated in FIG. 8. Charge E for the core layer is preselected to provide the suitable degree of stiffness, charge D is preselected to allow for good printability (usually following corona treatment of the formed film) and for weatherability if indicated, and charge F is preselected for good adhesive anchorage. As previously indicated, often charges D and F for the skin layers may be the same, and in some applications, the skin layer on the inner or adhesive side, corresponding to charge F, is eliminated. The coextrudates 54, 52, 56 forming the facestock may be hot-stretched.

The coextrudate may be directly coated with the adhesive 58, or the adhesive 58 may be transferred from a liner with which the facestock is combined. In particular, the coextrudate of cojoined facestock layers 54, 52, 56 may be substituted for the facestock 32 of FIGS. 3B to 3D, and the adhesive 58 may be the adhesive applied at the coating station S in FIG. 3A. The result is an all-plastic facestock/liner combination in which both the facestock and liner are multilayered.

Instead of being coated or combined on the formed coextrudate as just described, the adhesive 58 may be coextruded along with the film-forming layers 54, 52, 56. The invention also contemplates simultaneously

extruding both liner and facestock as by simultaneously extruding all the charges A through F, together with a charge of adhesive 58, which would for example be extruded through an additional orifice adjacent to the orifice for charge F. This would require provision of release means for the liner prior to contact of the liner by the adhesive.

The facestock construction 50a is manufactured in a manner similar to the manufacture of facestock 50. The additional tie layers 53 are coextruded along with the layers 52a, 54a, and 56a.

It should be evident that this disclosure is by way of example and that various changes may be made by adding, modifying or eliminating details without departing from the fair scope of the teaching contained in this disclosure. The invention is therefore not limited to particular details of this disclosure except to the extent that the following claims are necessarily so limited.

WHAT IS CLAIMED IS:

1. A liner comprising a multilayer web construction for use with label and sign stock, said web construction comprising a coextrudate in the form of at least two firmly adhered layers, at least one of said layers comprising a multiphase layer including a continuous phase of polymeric film material and a discontinuous phase of filler material, said liner having a first face that is roughened by the mechanical effect of the filler material contained in said coextrudate to the range of about 100 to 500 Sheffield units, the other second face of said liner having release means thereon.

2. A liner ás in claim 1, wherein said second face is roughened by the mechanical effect of the filler to exhibit through said release means a roughness in the range of about 5 to 150 Sheffield units, the roughness of said second face being less than the roughness of said first face.

3. A liner as in claim 1, wherein said release means comprises a silicone release coating.

4. A liner as in claim 1, wherein at least two layers of the coextrudate contain filler.

5. A liner as in claim 1, wherein only one of said layers contains filler, said filler being in the layer adjacent said first face.

6. A liner as in claim 1, wherein said web construction comprises a core layer, a first skin layer on the side of said core layer associated with said first face, a second skin layer on the side of said core layer associated with said second face, and release means on said second face, said core layer comprising said at least one multiphase layer with its filler therein, and said first skin layer also having filler therein.

7. A liner as in claim 6, wherein said filler in said first skin mechanically roughens said first face to a roughness in the range of about 100-350 Sheffield units, said second face being roughened by the mechanical effect of the filler in said core, acting through said second skin, to a roughness in the range of about 5 to 150 Sheffield units.

8. A liner as in claim 6, wherein said filler in said core layer comprises between about 10% and 40% by weight.

9. A liner as in claim 6, wherein said filler in said first skin layer comprises between about 1% and 15% by weight.

10. A liner as in claim 6, wherein said filler in said core layer comprises between about 10% and 40% by weight and said filler in said first skin layer comprises between about 1% and 15% by weight.

11. A liner as in claim 1, wherein said web construction comprises a core layer, a skin layer only on the side of said core layer associated with said second face, and release means on said second face, said core layer comprising said at least one multiphase layer with its filler therein.

12. A liner as in claim 11, wherein said filler in said core layer mechanically roughens said first face to a roughness in the range of about 125 to 500 Sheffield units, said second face being roughened by the mechanical effect of the filler in said core, acting through said skin layer, to a roughness in the range of from about 5 to 150 Sheffield units.

13. A liner as in claim 12, wherein said filler in said core layer comprises between about 12% and 40% by weight.

14. Roll or sheet stock for pressure-sensitive labels, signs, or other graphics comprising a liner web construction as in claim 2 combined with facestock by a pressure-sensitive adhesive layer which is releasably supported on said release means.

15. Roll or sheet stock as in claim 14, wherein the face of said adhesive adjoining said release means is roughened by said mechanical effect of said filler in said coextrudate, whereby upon separation of said pressure-sensitive adhesive and facestock from said liner web construction the exposed face of said adhesive exhibits the surface roughness imposed by said filler.

16. A liner comprising a multilayer web construction for use with label and sign stock, said web construction comprising a coextrudate in the form of a multiphase core layer and a skin layer on at least one side of the core layer, said skin layer comprising a polymeric film effective to receive and anchor a silicone release layer while acting as a stop against absorption of said release layer into said core layer, a silicone release layer on said skin layer, said core layer including a continuous phase of polymeric film material and a discontinuous phase of filler material, said filler material comprising by weight a minority of the total core composition, both said phases being dimensionally stable under conditions of moisture absorption or desorption, both said layers being substantially free of voids, whereby dimensional stability of said construction is independent of humidity conditions, and said construction therefore remains flat under varying humidity conditions as encountered at different geographic locations or at the same location at different times, and under varying web temperature conditions as encountered in hot air drying of inks or coatings for facestocks with which the liner is used.

17. A liner as in claim 16, having a skin layer on each side of said core layer, the skin layer on the side away from said silicone release layer also including a discontinuous phase of filler material.

18. A liner as in claim 17, said liner having a face at the outside of said last-named skin layer which is roughened by the filler in said layer to a roughness in the range of from about 100 to 350 Sheffield units.

19. A liner as in claim 18, the filler in said core layer acting through the skin layer on the side identified with said release layer to roughen the face of said release layer.

20. A liner as in claim 19, said face of said release layer being roughened to a roughness in the range of from about 5 to 150 Sheffield units, the roughness of said face at the outside of the skin layer on the side away from said silicone release layer exceeding that of said face of said silicone release layer.

21. A method of manufacturing all-plastic liner for label stock which will roughen the adhesive surface of the label stock to a degree suitable for labeling applications while simultaneously providing for the roughening of the exposed face of the liner to a higher degree suitable for high speed web tracking, comprising the steps of

providing a plurality of at least two charges of film-forming resin of like or unlike composition,

predefining a fill differential by mixing filler in said charges to preselected differing degrees and/or of differing charge characteristics sufficient to affect the roughness of each face of the resulting coextrudate,

coëxtruding said charges to thereby form a multilayer polymeric liner comprising cojoined layers and establish said predefined fill differential between different layers of the formed liner and thereby differentially affect the roughness of the liner faces,

and choosing said preselected differing degrees and/or characteristics of filler mix such that the face of the liner which is to contact the adhesive surface of label stock exhibits a degree of roughness suitable for the label adhesive and the face of the liner which is to be the exposed face in use exhibits a higher degree of roughness suitable for high speed web tracking.

22. A method as in claim 21, in which, in said step of mixing filler in said charges to preselected different degrees and/or characteristics, one of the selected degrees is zero amount of filler.

23. A method as in claim 21, including the step of hot-stretching the formed films to provide machine direction orientation of the polymeric liner.

24. A multilayer facestock for use in pressure-sensitive label and sign applications comprising a coextrudate of cojoined layers comprising a relatively thick core layer of polymeric film material of a stiffness of between 10 and 100 Gurley and which contributes the majority of the dimensional stability and stiffness of labels or signs cut or formed from the facestock, and at least one relatively thin skin layer, said skin layer being on the face side of the coextrudate and having an ink-printable surface, and a pressure-sensitive adhesive layer combined at the side of said coextrudate opposite said face side.

25. Stock as in claim 24, in which said core material is polyethylene of a specific gravity of between about .890 and .965 or a polypropylene polymer or copolymer with a flex modulus range of between 130,000 and 250,000 psi at 73^{o}F.

26. Stock as in claim 25, in which said skin layer comprises ethylene vinyl acetate or polyvinyl chloride having a corona-treated outer surface.

27. Stock as in claim 24, including a second skin layer on the core layer between the core layer and the adhesive layer.

28. Stock as in claim 24, said coextrudate having a tie layer between said core layer and said at least one skin layer.

29. Stock as in claim 28, said coextrudate having a tie layer between said core layer and each skin layer.

30. Label or sign stock comprising the adhesive bearing face stock of claim 24 combined on its adhesive side with a releasable liner.

31. Label or sign tock as in claim 30, said releasable liner being that of claim 1 whereby both the facestock and liner comprise coextrudates.

32. A method of economically manufacturing facestock for labels and signs, comprising the steps of

providing a plurality of at least two charges of film-forming resin,

coextruding said charges to thereby form a multilayer extrudate comprising a relatively thick core layer and at least one relatively thin skin layer, the former layer providing the majority of the dimensional stability and stiffness of the construction,

preselecting the charge for said core layer, as by selection of density or flex modulus, to provide a degree of stiffness suitable for the label or sign application,

preselecting the charge for said skin layer to provide a skin adapted to the intended decorating process,

and combining said extrudate with a pressure-sensitive adhesive layer to form facestock suitable for cutting into labels or signs.

33. A method as in claim 32, in which said combining step comprises applying said adhesive layer onto said extrudate by transfer coating or by direct application following said step of coextruding.

34. A method as in claim 32, in which said combining step comprises coextruding said adhesive layer simultaneously with said other layers.

35. A method as in claim 33, including in said coextruding step the coextruding of relatively thin skin layers on each side of said core layer.

36. A method as in claim 32, including in said coextruding step the coextruding of a tie layer between said core layer and said at least one skin layer.

37. A method as in claim 35, said core layer comprising polyethylene film and said skin layer comprising polyvinyl chloride film.

38. A method as in claim 32, said core layer comprising polyethylene film and said skin layer comprising ethylene vinyl acetate film.

39. A method of economically manufacturing an all-plastic stock for use by manufacturers of adhesive labels, comprising the steps of

coextruding a liner comprising multiple layers of film forming resin,

including within said coextrusion step discriminating between the charges for said layers to thereby differentiate the surface roughness of the opposed faces of the coextrudate, with a first face having the greatest roughness,

either simultaneously with said extrusion step or subsequently thereto combining release means at the other or second face of the coextrudate,

either simultaneously or subsequently to said extrusion step also coextruding facestock comprising multiple layer film forming resins,

and either simultaneously or subsequently to said first-mentioned coextrusion step also temporarily joining said liner and facestock with a layer of pressure-sensitive adhesive which is releasably joined to said second face of said liner coextrudate and permanently to the inner face of said facestock.

40. A method as in claim 39, in which said discriminating step includes the employment of differential fill as between different layers of the coextrudate.

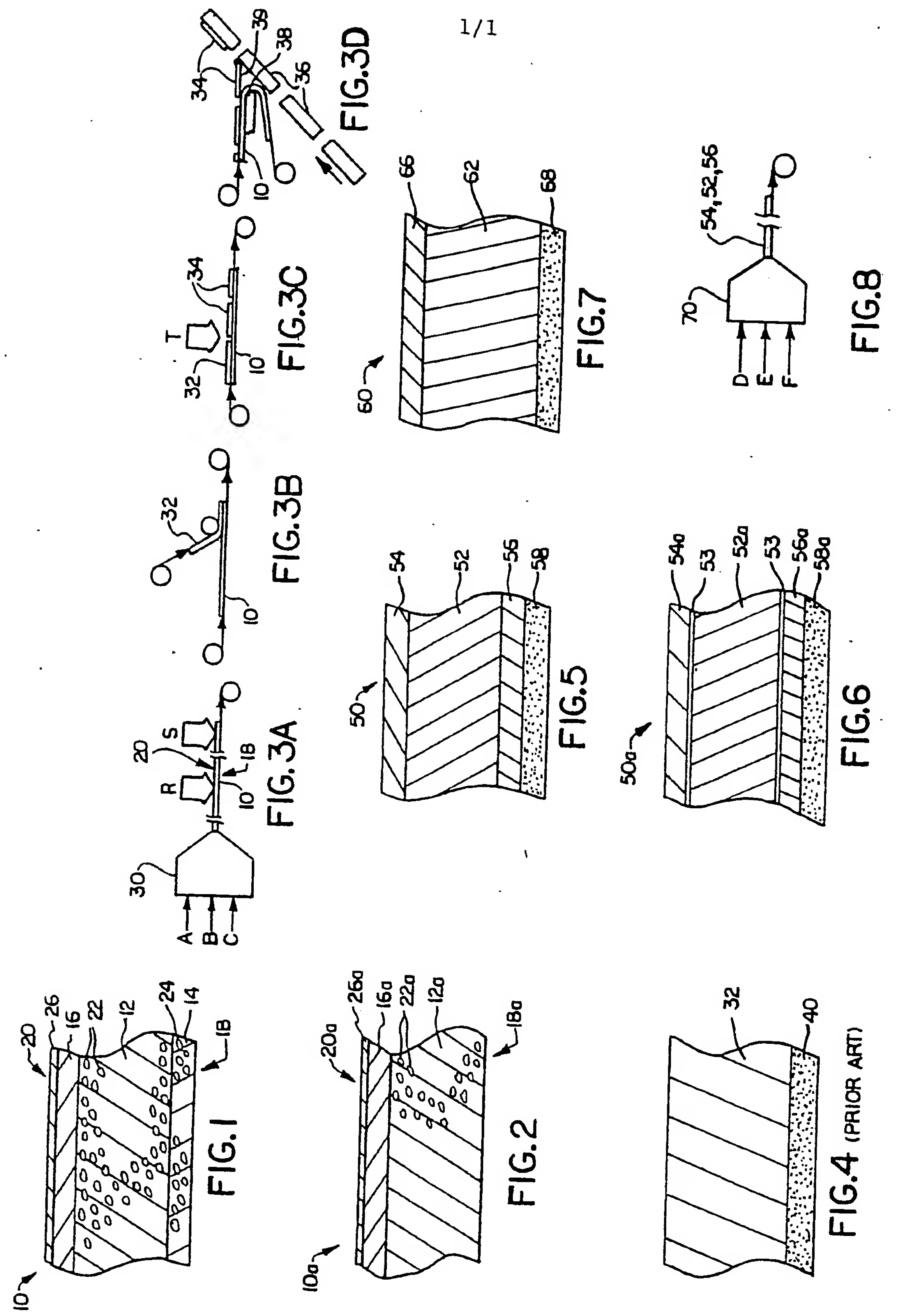
FIG.1
FIG.2
FIG.3A
FIG.3B
FIG.3C
FIG.3D
FIG.4 (PRIOR ART)
FIG.5
FIG.6
FIG.7
FIG.8

INTERNATIONAL SEARCH REPORT

International Application No PCT/US86/00254

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

INT. CL.4 B32B 7/00, 31/00; B29C 47/00

U.S. CL. 156/244.11; 428/40, 354, 906, 910

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
U.S.	156/244.11, 244.16, 244.19 428/40, 354, 516, 906, 910

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
Y	US, A, 4,331,727 (STANLEY MAAS) 25 MAY 1982 Entire column 3.	1-40
Y	US, A, 4,386,135 (MINNESOTA MINNING & MANUFACTURING CO.) 31 MAY 1983 Entire col. 2.	1-40
Y	US, A, 4,393,115 (TORAY INDUSTRIES) 12 JULY 1983; Entire columns 3-7.	1-40
Y	US, A, 4,410,582 (TORAY INDUSTRIES) 18 OCTOBER 1983; Entire columns 3-7	1-40
P,Y	US, A, 4,513,050 (FUJI FOTO FILM CO. LTD.) 23 APRIL 1985; Entire columns 3-7.	1-40
P,Y	US, A, 4,522,887 (TORAY INDUSTRIES, INC.) 11 JUNE 1985; Entire columns 8-10.	1-40

* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of particular relevance

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
15 APRIL 1986	25 APR 1986
International Searching Authority [1]	**Signature of Authorized Officer [20]**
ISA/US	W.J. VanBalen

Form PCT/ISA/210 (second sheet) (October 1981)